CHAPTER 6

Cumulative Effects Analysis

This analysis expands on the cumulative effects analysis presented in the I-405 Corridor Program Final EIS to address cumulative effects of the Kirkland Nickel Project. Cumulative effects are important to consider during the construction and operation of a project. While they may be minor when viewed in the individual context of direct[1] and secondary[2] effects, they can add to the effects of other actions and eventually lead to a measurable environmental change.

What are cumulative effects and why do we study them?

The Council on Environmental Quality's[3] regulations implementing the procedural provisions of the National Environmental Policy Act define cumulative effects as:

> *"The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions."*[4]

The Council on Environmental Quality recommends that an agency's analysis accomplish the following:

- Focus on the effects and resources within the context of the proposed action.
- Present a concise list of issues that have relevance to the anticipated effects of the proposed action or eventual decision.
- Reach conclusions based on the best available data at the time of the analysis.

Please refer to the Kirkland Nickel Project Cumulative Effects Discipline Report in Appendix Y (on CD) for a complete discussion of the cumulative effects analysis.

[1] Effect caused by the proposed action and occurring at the same time and place.
[2] Effect caused by the proposed action that is later in time or farther removed in distance, but still reasonably foreseeable.
[3] The federal agency charged with implementing the National Environmental Policy Act.
[4] 40 CFR 1508.7

- Rely on information from other agencies and organizations on reasonably foreseeable projects or activities that are beyond the scope of the analyzing agency's purview.
- Relate to the geographic scope of the proposed project.
- Relate to the temporal (timeframe) period of the proposed project.

Cumulative effects can be positive as well as negative depending on the environmental resource being evaluated. It is possible that some environmental resources can be negatively, and other positively, impacted by the same proposed project.

If identified, how will adverse cumulative effects associated with the Kirkland Nickel Project be mitigated?

For the Kirkland Nickel Project to be consistent with regulatory guidance, reasonable measures to minimize adverse effects have been incorporated into the project design. The measures are a combination of mitigation and enhancements that include minimizing impacts to wetlands, construction of noise walls, improvements to fish habitat, treatment of stormwater, and use of a traffic management plan.

What is the relationship between this cumulative effects analysis and that contained in the I-405 Corridor Program Final EIS?

The cumulative effects analysis for the Kirkland Nickel Project used the cumulative effects analysis in the *I-405 Corridor Program Final EIS* as a starting point. The I-405 Corridor Program cumulative effects analysis focused on air quality, energy, farmlands, fish and aquatic habitat, surface water, and wetlands. However, for the Kirkland Nickel Project, neither energy nor farmlands were included in the cumulative effects analysis. Farmlands were determined not to be affected at all by the project. Energy was not analyzed because the difference in energy consumption at the regional level with or without the project was predicted to be un-measurable. The project-level analysis was then conducted, based on the results of scoping, agency consultations, and the anticipated direct and secondary effects on surface water, wetlands, and fish and aquatic habitat due to the Kirkland Nickel Project.

What are the temporal and geographic boundaries for this analysis?

When evaluating cumulative effects, the analyst must consider expanding the geographic study area beyond that of the proposed project, as well as expanding the temporal limits to consider past, present, and future actions that may affect the environmental resources of concern.

The geographic scope of analysis is defined by the physical limits or boundaries of the Kirkland Nickel Project's effect on an environmental resource, as well as the boundaries of other activities that also may contribute to the effects on that environmental resource. The temporal limits are determined by identifying time limits that are both relevant to the project and reasonable. The temporal and geographic boundaries can be different for each environmental resource evaluated.

The temporal and geographic boundaries established for the cumulative effects analysis for the Kirkland Nickel Project were based on those used in the *I-405 Corridor Program Final EIS*, scoping, agency consultations, and the area directly affected by the project itself.

Geographic Boundaries

The geographic boundaries for the surface water, wetlands, and fish and aquatic habitat analyses included the Forbes Creek, Lake Washington East/Bellevue North, Juanita Creek, and Sammamish River watersheds (Exhibit 6-1). Expanding the geographic area beyond that of the direct impact area of the Kirkland Nickel Project allowed a more comprehensive analysis of the cumulative effects on the environmental resources. This geographic area was also consistent with the area that was evaluated in the biological assessment that was prepared for the project under the Endangered Species Act.

Temporal Boundaries

The temporal boundaries, 1960 through 2030, inclusive, were set for all three environmental resources analyzed (surface water, wetlands, and fish and aquatic habitat). Using 1960 as the starting point for the analysis allowed an assessment of the changes that have occurred since the original construction of I-405. The year 2030 is the future year used in regional transportation planning documents.

Exhibit 6-1
Geographic Boundaries for Surface Waters, Wetlands, and Fish and Aquatic Habitat

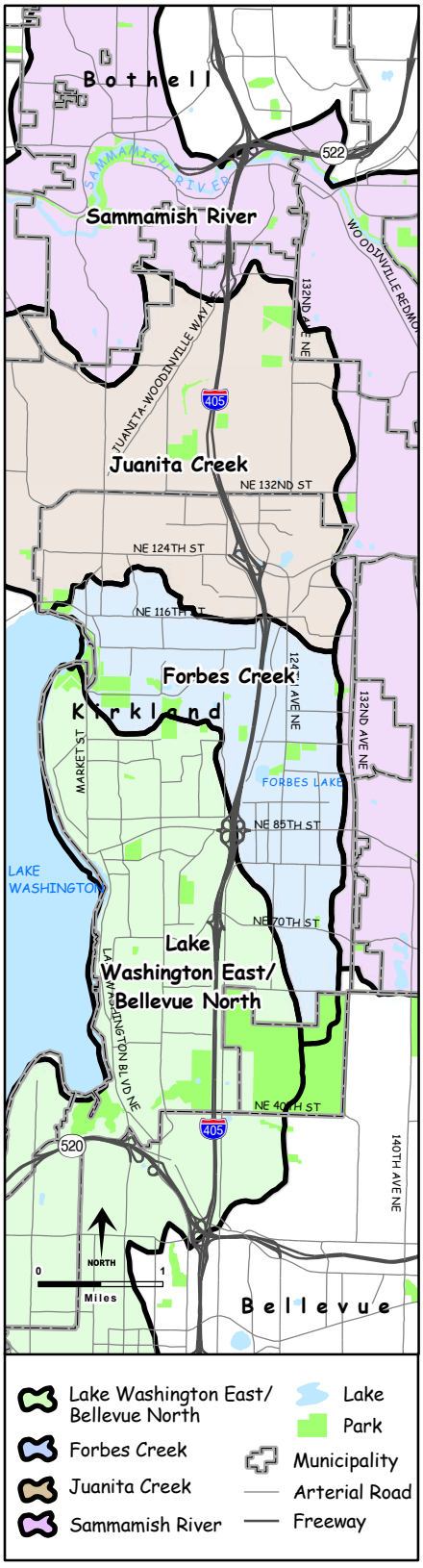


Exhibit 6-2
Projects Considered in Cumulative Effects Analysis

Under what circumstances were other projects included in the cumulative effects analysis for the Kirkland Nickel Project?

For the effects of other major future projects to have been considered, the projects must be located within or nearby the geographic boundaries used for the cumulative effects analysis. The projects must also be reasonably foreseeable. For transportation projects, this typically means the projects are planned, approved, and funded. Specific projects considered in the cumulative effects analysis are (Exhibit 6-2):

- *King County Wastewater Treatment Division, Brightwater Conveyance System, North Creek Portal.* The portal will be constructed in the southeast quadrant of the intersection of NE 195th Street and North Creek Parkway. Activities at this site will involve demolition of the existing office building; excavation of a 90 feet deep portal 50 feet wide and 120 feet long; access for removal of spoils from the excavation of a 2.8-mile long, 18-foot diameter tunnel; lining of the tunnel; and installation of an influent pump station and other facilities. Construction is scheduled to begin in 2005 and last five years.
- *Sound Transit, Bothell Branch Campus Access at NE 195th Street/I-405.* HOV improvements being considered are transit signal priority at entrances, arterial HOV enhancements, and development of a transit hub with transit customer parking. Construction would begin in 2005 and be completed in 2006.
- *Sound Transit, Totem Lake Transit Center/NE 128th Street.* The transit center will be located on NE 128th Street at 120th Avenue NE. Development of the new transit center will begin in 2005 and continue through 2006.
- *Sound Transit, Totem Lake Freeway Station/NE 128th Street.* The station will consist of a new bridge over I-405 at NE 128th Street and direct access ramps connecting the HOV lanes on I-405 with the new crossing. Construction will begin in mid-2005 and be completed in 2007.
- *City of Kirkland, NE 85th Street HOV Lane.* The City of Kirkland is planning to add a dual left-turn lane from 114th Avenue NE to eastbound NE 85th Street and an

HOV priority lane on NE 85th Street. The HOV lane will start at Kirkland Way and extend east to connect with the HOV lane on-ramp to southbound I-405. Construction is planned for late 2005 and early 2006. Improvements will also be made at the intersection of 124th Avenue NE and NE 85th Street in the same timeframe.

What has been the history of the environmental resources analyzed?

Surface Water

Lake Washington has seen considerable changes since 1960. Continued development around the lake has resulted in large portions of the surrounding watersheds becoming urban/ suburban in nature. With this development has come a substantial increase in the areas covered by impervious surface.

Until the early 1960s, water quality in the lake continued to decline because of the contaminant loadings from increased runoff. The lake also served as the receiving water for septic and sewage system discharges. The pollution combined with elevated temperatures in the summers caused the lake to take on a cloudy, "pea soup" appearance. The creation of the Municipality of Metropolitan Seattle (Metro) and the subsequent construction of regional wastewater treatment plants in Renton and Seattle, led to the elimination of municipal wastewater discharges to Lake Washington (except in the case of certain infrequent overflow events), resulting in dramatic improvements in water quality by the mid-1970s.

Portions of the streams in the project area have also undergone major changes. These have primarily come about simultaneously with conversion of natural areas to urbanized landscapes and included channelization, removal of woody debris from the streams, re-routings, bank armoring, loss of stream-side vegetation, heavy silt and pollutant loadings, and elevated summer temperatures. Water in these streams ultimately reaches Lake Washington and affects water quality there.

Recognition of the declining ecological conditions in the streams and the lake set the stage for implementation of laws and regulations to curb this trend and provide for restoration

of degraded stream habitats. By the 1970s, local municipalities began to recognize that some form of stormwater management was needed for new developments. Stormwater utilities were established and best management practices (BMPs) for the control of stormwater runoff were developed and implemented.

The *Puget Sound Water Quality Management Plan* was published in the late 1980s. The early 1990s brought the issuance of King County's *Surface Water Design Manual*, Ecology's *Stormwater Management Manual for the Puget Sound Basin*, and WSDOT's *Highway Runoff Manual*. Stormwater detention and water quality treatment became mandatory for all projects within areas draining to Puget Sound. Statutes (e.g., the Clean Water Act (CWA), Growth Management Act (GMA), and the Shoreline Management Act (SMA)) and their associated implementing regulations have provided additional guidance. Stormwater management requirements have continued to evolve and, in general, have become more stringent.

In general, the design standards for the Kirkland Nickel Project now require treatment for more than 100 percent of new impervious surfaces and detention of the two-year through 50-year storm events.

Wetlands

Numerous federal, state, and local laws, regulations, ordinances, and orders now govern activities in or near wetlands. That was not the case in 1960. The passage of the NEPA in 1969 required project proponents to evaluate the impacts of their projects on the environment including wetlands. Federal Executive Order 11990 issued in 1978, required all federal agencies to provide for wetland protection in their policies. The US Department of Transportation complies (DOT Order 5660.1A) with that mandate during the planning, construction, and operational phases of transportation facilities and projects. Additionally, legislation at the state level, such as the State Environmental Policy Act (SEPA) and the GMA, as well as county and municipality ordinances, now regulate wetlands. The local ordinances governing wetlands and other sensitive/critical areas continue to evolve. In general, required mitigation and compensatory measures have become more stringent with the passage of time.

In general, wetland resources in the four watersheds have continued to decline over time due to increased urbanization and the associated loss of natural systems and landscapes. While environmental awareness has increased through the passage of legislation, the number, size, and function of wetlands has continued to decline. However, the rate of decline has decreased and that trend is likely to continue. The goal of *No Net Loss* and improved avoidance, mitigation, and compensation measures are helping to restore wetland areas, functions, and values. Advanced scientific studies, refined regulatory requirements and programs, and use of adaptive management procedures will serve to further enhance the restoration trend.

Fish and Aquatic Habitat

Although fish populations fluctuate naturally, in general, their numbers have markedly declined and the extent and quality of their habitat[5] decreased over the past century. Two major factors affecting fish populations in the Kirkland Nickel Project area are harvest and habitat. This cumulative effects analysis focused on habitat (including water quality, stream flows, physical features, and ecosystem interactions).

As the human population and the extent of development in the project area have increased over time, aquatic habitat has been eliminated and/or degraded. Aquatic habitat alteration has taken the form of removal of forest cover and stream-side vegetation, channel modification, bank armoring, dredging, removal of woody debris from streams, routing of streams through culverts, alteration of natural stream flow regimes, and construction of barriers to fish passage.

With the intent of stopping the decline in fish populations and the loss/degradation of aquatic habitat, laws and regulations applicable to aquatic habitats and fish have continued to increase in number and complexity since the 1960s. Examples include:

[5] Fish habitat includes the physical, chemical, and biological components of the environment that support fish throughout their life cycle. These components include water quality, stream flows, physical features, and ecosystem interactions related to the habitat.

- Endangered Species Act (ESA) of 1973 – provides protection for threatened and endangered fish[6], wildlife, and plants
- Clean Water Act – regulates discharges of pollutants into surface waters of the United States
- Sustainable Fisheries Act of 1996 – requires the identification and conservation of habitat that is "essential" to federally-listed fish species.

Additionally, local regulations, ordinances, and policies provide for the protection of fish and aquatic habitat through shoreline management and sensitive area requirements.

The Washington State Salmonid Stock Inventory identifies five salmonid stocks within the I-405 Corridor Program area as "depressed"[7]: Cedar River sockeye, Lake Washington beach sockeye, Lake Washington/Sammamish tributary sockeye, Lake Washington/Sammamish tributary coho, and Lake Washington winter steelhead. Each of these stocks has been on a declining trend. Any cumulative adverse effect can contribute to the continuance of such a declining trend.

ESA-listed fish species that may occur in the vicinity of the Kirkland Nickel Project include chinook salmon and bull trout. Bull trout/Dolly Varden have been reported in Lake Washington, but none in any of the streams in the project area. Construction of the Kirkland Nickel Project will not involve any instream work for any water bodies that may be used by chinook salmon.

No ESA-listed species have been identified in Yarrow Creek. Cutthroat trout use the stream throughout its length. Coho (candidate ESA species) have access and may use its lower reaches. Non-salmonids likely present include stickleback and sculpin.

Salmonid habitat has been degraded by intensive development in the Forbes Creek watershed. The watershed downstream of I-405 has extensive wetland and open space. However, there are two migration barriers downstream of I-

[6] Declining populations have led to the listing of Puget Sound chinook salmon and bull trout as "threatened" under the ESA.

[7] A stock whose production is below expected levels, based on available habitat and natural variation in survival rates, but above where permanent damage is likely.

405. Coho, coastal cutthroat trout, sockeye, and possibly steelhead use Forbes Creek. Trout populations may also spawn in Forbes Lake and in the upper watershed and contribute to downstream recruitment below I-405. Non-salmonid species in the creek system include stickleback, lamprey, and dace. No chinook salmon have been found in Forbes Creek in recent field surveys.

Intensive urbanization in the Juanita Creek watershed has severely degraded salmon habitat. Juanita Creek, although utilized by other salmonids (coho, sea-run cutthroat, resident cutthroat), is not used by chinook. Migration and rearing habitat is not available for chinook. Non-salmonids likely present include stickleback, lamprey, dace, and sculpin.

Coho, sockeye, kokanee, and chinook salmon, as well as steelhead, sea-run cutthroat, resident trout, and non-salmonids (large-mouth bass, sculpin, lamprey, dace, and stickleback) use the main stem of the Sammamish River for migration and rearing. Poor water quality, especially high temperatures, limits salmonid production in the system. Salmonid use is primarily as a migration corridor to better upstream habitats.

Of seven un-named streams in the project area, only two have documented salmonid (resident cutthroat – both streams, coho – one stream) presence, and four have barriers to anadromous fish passage downstream of I-405.

What contribution to cumulative effects will result from construction of the Kirkland Nickel Project?

If current schedules do not change, the Kirkland Nickel Project and all of the other five projects included in the cumulative effects analysis could be under construction at the same time from late 2005 through 2006. Construction of the Totem Lake Freeway Station would continue into early 2007. Simultaneous construction of the Brightwater Conveyance System North Creek Portal Facilities and portions of the Kirkland Nickel Project would extend into 2010.

Surface Water

The Kirkland Nickel Project will include construction of a new storm drain system that will collect, treat, and discharge highway runoff from the new impervious surfaces and some replaced pavement areas. In general, effects on surface waters

during construction could include increased runoff volumes and increased peak flows.

The project will be constructed in accordance with federal and state technical guidance, permit conditions, and WSDOT specifications that will require the use of Best Management Practices (BMPs) to control the rate of runoff and, where practical, to retain runoff on the site. Regardless, there will be the potential for increased runoff entering some local waterways. However, the receiving waters and drainage systems that convey water to Lake Washington will each receive only a small percentage of their total flow from the construction areas. Increased runoff and peak flows during construction can potentially adversely affect water quality in the receiving waters. The decreased water quality can negatively affect fish and organisms living in the waters.

Minimization of the Kirkland Nickel Project's contribution to cumulative effects on surface waters will be achieved through implementation of applicable BMPs and compliance with regulatory requirements and permit (e.g. NPDES Construction Stormwater Permit) conditions. It is assumed that similar mitigation measures will be followed, where appropriate, for the other five projects being implemented by others. As a result, construction-related cumulative effects on surface waters attributable to the Kirkland Nickel Project and the other five projects (Brightwater Conveyance System North Creek Portal and Bothell Branch Campus Access (Sammamish River Watershed); Totem Lake Freeway Station and Totem LakeTransit Center (Juanita Creek Watershed); NE 85th Street HOV Lane (Forbes Creek and Lake Washington East/Bellevue North Watersheds)) included in the cumulative effects analysis should be temporary and of low magnitude.

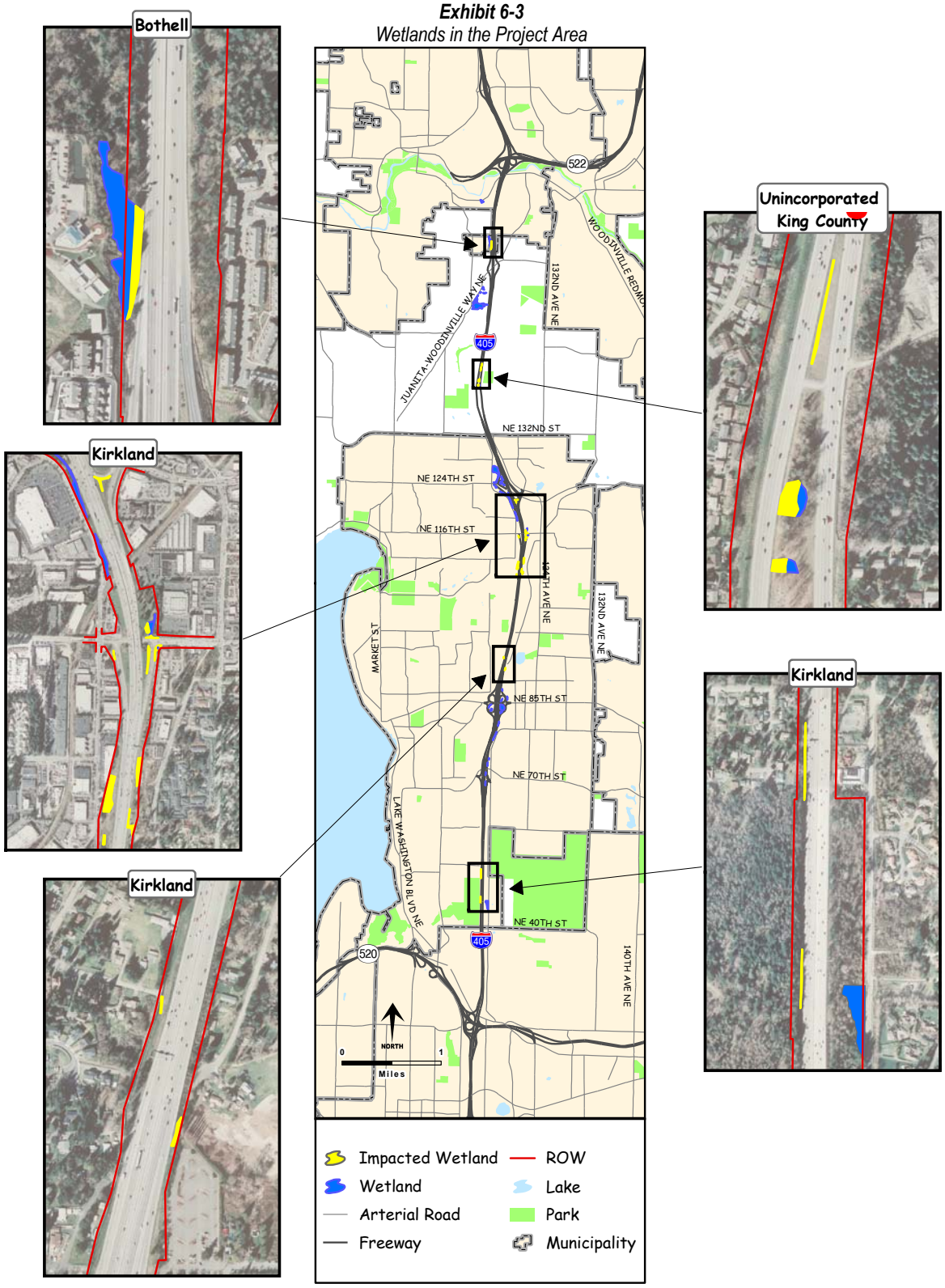
Wetlands

Currently, within the project area, the Lake Washington East/Bellevue North Watershed has 14 wetlands covering 2.32 acres, the Juanita Creek Watershed has 8 wetlands covering 4.11 acres, the Forbes Creek Watershed has 11 wetlands covering 2.02 acres, and the Sammamish River Watershed has two wetlands covering 0.037 acres. Fifteen of the wetlands within the project area are stormwater facilities or stormwater conveyance swales or ditches. All of the wetlands within the project area have been disturbed to some extent by development, including the construction of I-405 and

development in the surrounding area. Approximately 0.19 acres of wetlands will be temporarily affected because of construction activities and approximately 1.832 acres of wetlands will be permanently filled (Exhibit 6-3). The distribution of permanently filled wetlands by watershed will be Forbes Creek – 1.297 acres, Lake Washington East/Bellevue North – 0.096 acres, Juanita Creek – 0.304 acres, and Sammamish River – 0.136 acres.

Based on the mitigation that will occur to compensate for the loss of the 1.832 acres, a positive contribution to cumulative effects (more wetlands created or enhanced than filled or permanently impacted) to wetlands within the affected areas can be realized as a result of the construction of the Kirkland Nickel Project.

Exhibit 6-3
Wetlands in the Project Area



Wetlands will be affected in the Juanita Creek Watershed by the Totem Lake Freeway Station as well. That project should also provide a positive contribution to cumulative effects (more wetlands created or enhanced than filled or permanently impacted) on wetlands.

Fish and Aquatic Habitat

Temporary minor loss of aquatic habitat and minor changes in stream flows will occur due to the construction of the Kirkland Nickel Project. These effects (e.g., temporary loss of stream-side vegetation, increased sedimentation, changes in the stream flows, and course modifications) will be minimized through the use of BMPs and compliance with in-water work windows set by the fish and wildlife regulatory agencies.

None of the other five projects included in the cumulative effects analysis will directly affect fish and aquatic habitat.

What contribution to cumulative effects will result from operation of the Kirkland Nickel Project?

Surface Water

The Kirkland Nickel Project's contribution to cumulative effects on surface waters during operation will likely be positive in all four watersheds. The greatest benefits will be gained through maintenance of the enhanced treatment for the new pavement areas and the retrofitted treatment of the 16.9 acres of existing pavement where previous runoff was not treated. The application and maintenance of similar standards for the other projects (Brightwater Conveyance System North Creek Portal and Bothell Branch Campus Access (Sammamish River Watershed); Totem Lake Freeway Station and Totem Lake Transit Center (Juanita Creek Watershed); NE 85th Street HOV Lane (Forbes Creek and Lake Washington East/Bellevue North Watersheds)) included in the cumulative effects analysis will likely result in positive effects on surface waters as well.

Wetlands

The operation of the Kirkland Nickel Project may provide a positive contribution to the cumulative effects (although difficult to measure) on wetlands. That positive effect would result from the improvements in surface water quality and flows to streams in the area. Those improvements would be due to the Kirkland Nickel Project's enhanced treatment of the

runoff from the new impervious surfaces and the establishment of enhanced water quality treatment for presently untreated impervious surfaces. Similar positive effects may result from the other five projects (Brightwater Conveyance System North Creek Portal and Bothell Branch Campus Access (Sammamish River Watershed); Totem Lake Freeway Station and Totem Lake Transit Center (Juanita Creek Watershed); NE 85th Street HOV Lane (Forbes Creek and Lake Washington East/Bellevue North Watersheds)) included in the cumulative effects analysis.

Fish and Aquatic Habitat

Proper maintenance and continued operation of the Kirkland Nickel Project facilities should maintain its positive contribution to cumulative effects on fish and aquatic habitat.

None of the other five projects included in the cumulative effects analysis will directly affect fish and aquatic habitat.

What measures are proposed to minimize cumulative effects?

No measures, beyond those incorporated in the project design, are necessary.